

This response was submitted to the consultation held by the Nuffield Council on Bioethics on Emerging biotechnologies between April 2011 and June 2011. The views expressed are solely those of the respondent(s) and not those of the Council.

**A RESPONSE to THE NUFFIELD COUNCIL ON
BIOETHICS CONSULTATION PAPER on EMERGING
BIOTECHNOLOGIES**

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**Essay on Emerging Biotechnologies: A Response to the Nuffield
Consultation Paper**

3. What currently emerging biotechnologies do you consider have the most important implications ethically, socially and legally?

There are a number of emerging biotechnologies that have recently grasped the public's attention and stimulated ethical debates. The technology that we find the most promising is regenerative medicine involving the use of embryonic stem cells. The potential of stem cells was first discovered in the 1960s and since then it has been the focus of media attention due to the ethical and social implications of embryonic stem cell research.

Stem cells are totipotent and therefore have the potential to differentiate into any cell type. They harbour the highest potential for those diseases that currently have no cure such as Parkinson's disease and Alzheimer's disease and also for the regeneration of organs consisting of permanent cells [1]. However, the procurement of embryonic stem cells requires the creation and destruction of embryos which for some is tantamount to murder [2]. The 'pro-life' movement and many religious believers hold the view that human life begins from conception and so the sanctity of life is being violated [2]. This consequently raises a whole host of questions as to the definition of human life and whether or not we are arguing on the potential for human life. Such views have led to highly regulated laws and policies surrounding human embryo research in many parts of the world. For example, in the United Kingdom a "14 day limit" for embryonic research has been implemented [3].

In consideration of the social implications of stem cell research, there may be issues regarding the allocation of stem cell therapy and the establishment of a postcode lottery. Future years may see the use of such treatment as the exclusive privilege for those who can afford it, meaning there will be inequality of treatment for individuals. Furthermore, we need to consider the social cost of destroying so many potentially viable embryos in contrast to so many failed IVF treatments and the numbers of childless couples who long for a child of their own. Until recently the use of stem cell therapy in treatment has not been approved but with further developments and the revision of governmental laws and regulations, society's views will need to adapt in preparation for increased use of human embryonic stem cells in medical research and care. Current legislation as per the Human Fertilisation and Embryology Act 2008 permits the destruction of embryos for harvesting stem cells. However, the research must satisfy any of the following requirements: to increase knowledge about the development of embryos, to increase knowledge about serious disease, or to enable any such knowledge to be applied in developing treatments for serious disease [4].

There are ramifications for the legalisation of stem cell research and human embryonic creation, storage and destruction, nowhere more so than in countries where laws and regulations are not yet in place. There is the potential for abuse and the establishment of a black market for human tissue trafficking for those scientists who do not take these ethical, social and legal implications into account in the search for the next scientific breakthrough. In particular, the short time frame of 14 days for the use of human embryonic stem cells means there will be a demand for more human oocytes.

A BBC programme, “How to Mend a Broken Heart,” detailed a new and interesting technique of regenerating organs from a “ghost skeleton” by stripping the donated animal organ of its original cells and replacing it with stem cells derived from the patient’s bone marrow. This removes the need for embryonic stem cells but does however introduce a new debate on the use of animals to provide the supply of organs, hence the unpopular use to date of xenotransplantation.

15. What role should public opinion play in the development of policy around emerging biotechnologies?

We believe that public opinion is important to consider in the developmental processes of many emerging biotechnologies; however, adverse public reactions towards biotechnologies based on unnaturalness or uncertainty of future risk should not hinder scientific research into areas that could potentially have health and economic benefits. Based on this, we believe policies surrounding biotechnology should not completely restrict scientific exploration. In many societies in the world, the general public is not afraid to voice their opinions with regard to biotechnologies such as genetically modified (GM) crops, embryonic stem cell research and reproductive cloning. The media plays a large role in shaping the perception and attitudes of the public towards different biotechnologies but the problem with people solely relying on the media as their source of information is that the media may not be completely objective.

The media have a strong influence on public opinion about GM crops. In the first week of November 2003, protesters from all over England headed to Bayer Crop Science in Newbury and held a mass protest against the commercialisation of GM crops. Many campaigners argued that if Bayer gets its way, the UK will be “flooded

with GM crops, all of which end up irreversibly released into the environment and contaminating our food” [5]. Such protesters are not representative of the entire population because farmers for instance see many potential economic and agricultural benefits of GM crops [6]. Thus, the government should be careful when making policy decisions that could potentially completely restrict GM crop biotechnology just based on the opinions of people who oppose it.

In 1999, a Eurobarometer survey conducted by Gaskell *et al.* explored public perceptions of a wide range of biotechnologies across Europe [7]. Overall, the survey results showed that there is a “declining optimism” [7] about biotechnology when compared with three prior surveys. When the public were asked whether biotechnology will improve the quality of life 20 years later, only 46% of respondents were optimistic compared with 50% and 53% in 1996 and 1993, respectively [7]. With regards to GM crops, the survey results suggested that opponents were concerned that the crops “threaten the natural order” [7] of ecosystems by harming organisms that ingest these products and by also decreasing biodiversity. There are also concerns from both opponents and supporters of GM crops about the risks of new allergies emerging and new diseases from bacteria and viruses [7]. Public opinions regarding GM crops are important due to the fact that the public could be less inclined to buy GM foods. Both supporters and opponents of GM foods have expressed demands for having GM foods always labelled in the supermarkets and this should be given considerable weight in policy decisions [7].

The public in many parts of the world also has strong opinions on the use of embryonic stem cells for research. In the USA in particular, there are considerable differences in public opinion with regards to stem cell research and could potentially influence a lot of policies surrounding the use of these cells. The Republican and

Democratic parties both hold different views in this area and this is important because depending on which state a U.S. citizen comes from their opinions could be influenced by the political party that caters to that state. The Republican Party strongly holds the 'pro-life' point of view and when George W. Bush was president, he withdrew funding and support from stem cell research programmes nationally. In contrast, the more liberal Democratic Party strongly holds the 'pro-choice' point of view; therefore, under President Obama's administration, there has been increased funding for stem cell research which could indirectly lead to more supporters for the research.

Currently, reproductive cloning is illegal in the UK and public opinion against this biotechnology is strong. Many people believe that artificially creating clones is unnatural and changes our perception of what it means to be human. The 1999 Eurobarometer Survey may help us begin to understand why some people hold this view. One of the trends observed in the study was that as the perceived usefulness of a biotechnology decreased, public perceptions of potential risks increased, consequently leading to opinions about the biotechnology being "morally unacceptable" [7]. This finding can help offer some insight into why public opinions on therapeutic cloning are less negative due to the fact that the substantial health benefit of this biotechnology in regenerative medicine has been well emphasized by researchers whereas some members of the public may not see any benefit of reproductive cloning. Also, there are many concerns regarding the long term implications of reproductive cloning, such as whether clones will develop, mature, and age normally. There is still a high degree of uncertainty about the risks of reproductive cloning which is why public opinion to date has had a large impact on policy decisions. More time spent

educating the public about the benefits of reproductive cloning may help relieve any undue anxiety.

Final thoughts

In conclusion, there are many ethical and social implications surrounding many emerging biotechnologies. The use of embryonic stem cells still remains a promising biotechnology for the future because this technology holds the potential to revolutionise regenerative medicine and provide new-found hope for the most debilitating of conditions. However, even though the groundwork has already been laid down for stem cell research, further monitoring and regulation is vital to avoid exploitation and the breach of ethical and moral values. We have also stated in this document that although considerable uncertainties surround many emerging biotechnologies, it is possible that by educating the public and keeping them more fully informed about the immediate and long-term benefits of these technologies public opinion can be altered [8]. Greater understanding of the roles social, economic, and geopolitical factors play in shaping public perception towards biotechnologies is still an area of further research [7].

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